AMERICAN ANNALS

OF

The Deaf,

EDITED BY

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UNDER THE DIRECTION OF

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LIFE'S MYSTERIES FOR DEAF CHILDREN.

IN these days of child study and investigation into the workings and growth of the child's mental life, every conceivable question seems to have been asked and many phases of child life have come under the critical analysis of interested investigators; but all results have not proved satisfactory.

Scientific men have come down from their pedestals of learning and been baffled in their scientific theories of life and its mysteries by an atom of humanity but a few hours or days of age. They have handled the small creatures as they would have handled an interesting and unknown plant, but each day their well-established theories have been most beautifully upset by some act or word of a small being to whom the world is new, and who seems to have been created for the sole purpose of puzzling the sages to whom the world is old, whether counting by the years that have passed over their heads or the thousands of years that this planet has revolved in space. The future holds little of significance to them, the past is fraught with events of interest, yet the time comes that a child, the most marvelous of God's creations, not only lifts for them the veil of the future, but opens the gates of Heaven, and they catch a glimpse of the realities of both; for nothing is so near Heaven as a little child.

Those who incline to a belief in a reincarnation of human souls watch and experiment, question and delve into the workings of the infant mind before them, endeavoring to discover that which may have existed before the present life began.

Others attempt to ascertain the gradual development of the mind and soul that look out upon a strange world for the first time.

Do infants think? Do they enter upon life here with a celestial language of their own, that we, heavy earth-clodden mortals, forgot long, long ago? Look into the depths of their wide, wondering eyes from which has not yet faded the light of Paradise. What would it profit us if we knew? Thus the wise men and women question, and blunder along blindly in their vain attempts to solve the problems propounded by themselves.

The first conscious attempts of children personally to investigate their surroundings and belongings is recorded, and then they move slowly onward in their study of the human wonder growing gradually beneath their eyes.

With children who are blessed with all their faculties the study becomes intensely interesting; their wonderful powers of acquisition, imitation and reasoning, and later questionings, never allow interest to flag.

Most extraordinary would be the circumstances surrounding a normal child of average educated people, which could prevent it passing many years without gleaning some information of a Supreme Being. But some children are born deaf and others are bereft of hearing by disease or accident while mere infants. In such cases it is quite possible for them never to have learned of such a Power. Many a profound student has endeavored to ascertain if a child placed under these adverse circumstances has any conception of God.

There stands before you a child, to all outward appearance as other children are, but its ears are stopped

and its tongue is silent. Silent only because sounds have never penetrated to its brain, and it can have no realization of spoken language. Does such a child think? has been repeatedly asked.

Language is not necessary to thought. Words are but a covering or a vehicle for thought.

The child sees; it has a mind and a soul; it acts, therefore it must reason. It loves and it hates. It rejoices and grieves. There is other language than that of words—the language of deeds and expression.

It would appear from many years of investigation that the congenitally deaf and dumb have no conception of a Creator, though some are known to entertain a vague questioning as to the power which creates. Their minds are as active as those of normal children, but they do not deal with the abstract. The seasons come and go; it is warm because the sun is, cold because of the snow. It is light owing to the presence of the sun, dark because of the absence of that luminous body. With the greater number the sun and moon are the same object; in the daytime the sun is large, at night it is usually small. These two planets and all the constellations play a most important part in the lives of these children, probably impressing them more strongly than anything else besides the night. Some entertain a fear of them and have a great horror of darkness. Like the celebrated colored preacher, Jasper, they think "the sun do move," and their amazement when taught differently is very great. They marvel why the trees and houses and everything else do not fall off the earth in its revolutions around the sun and its axis, and cannot in the least understand why earth, sun, and moon do not collide.

Before they have received some instruction it is extremely difficult to make them understand what it is desired to ascertain, but some information of interest has been gained by watching them while at play alone, or with companions.

Most decidedly they are capable of thought, though it may not be deep nor prolonged. Deaf-mutes are by no means hampered for lack of ideas, but for lack of some means of expression.

This means is given them as soon as they are admitted to a school for the deaf. Here they very quickly master the methods of communication in common use among their companions, and by the time they have spent a year in school their overburdened minds begin to find free vent for their insatiable desire for information. Those who are adepts in the language of gesture, with which the deaf and dumb most freely and naturally express themselves, have no difficulty in understanding them. But the possibility of answering them satisfactorily is another matter altogether.

It would seem as if their release from an irritating thraldom of silence had left some of them with a double amount of avidity for information, for they proceed to investigate and question with a persistency that should put to shame adults who are blessed with all their faculties.

One never realizes to the fullest extent their deplorable ignorance until these children, doomed to silence, with their newly-awakened sensibilities and keenly investigating infantile minds, begin to ask questions. And such questions! King Solomon must have been puzzled sometimes, could some of our little deaf people have tackled him. Their questions cover an extensive range. Man, the animal kingdom, the mineral and vegetable kingdoms, all natural phenomena, all things which walk, run, swim, creep, or fly, that have ever been brought to their observation, the visible and the invisible, the known and the unknown works of God and of man.

Whatever is evident to the senses of sight and feeling some active mind is very certain to puzzle itself about, and the next step is to puzzle the teacher. One needs to be a physician, chemist, botanist, astronomer, theologian,

mechanic, geologist, and scientist to answer satisfactorily many of their questions; at the same time one must become as a little child again to appreciate the mystery of life, the wonders of the universe, and be able to see them from the point of view of these little people, who have just discovered a language by which they can express themselves so as to be understood by the persons surrounding them.

It is interesting to note the difference in the questions propounded by a city and a country-bred child. The first generally has an insatiable desire to see the inside of everything and to know "what makes the wheels go round;" while the other most frequently asks questions regarding things brought to its notice in the great world of Nature.

Children have been accused of vindictive cruelty who have only followed their great desire to see the inner parts of things and to discover what made them move. Take the case of a little deaf boy who kept his teacher in an uncomfortable state of suspense as to the contents of his pockets, and the queer parcels he brought her for inspection almost daily, ranging from a dead kitten which he had drowned with the garden hose, while trying to manufacture a pond for it to swim in, to a good-sized garter snake that was very much alive. He wanted to know why the kitten did not swim and how the snake ran without any feet. Having learned the why and how of things, he had no farther interest in them and proceeded to find new curiosities. When taught that it hurt flies to have their wings pulled out, and that the little birds cried if their nests were destroyed, a more valiant defender of the small creatures could not have been found.

Children coming from crowded manufacturing districts have had little opportunity for observation of anything beyond their immediate surroundings. They expect to see wheels, belts, engines, and workmen everywhere they go, and take it for granted that everything has always

been in existence, and that what is not visible now will doubtless soon come from one of those great machines, in one of those big buildings, with which they are so familiar.

A small class of deaf children, in a Western city, one day became possessed with an intense interest in the telegraph poles that stood near the school-house. They were observed one recess with their hands and faces pressed closely against the poles. It was afterwards discovered that they had been listening to the vibrations made by the humming and buzzing of the wires. One of the first questions was if there was something inside the poles. The next observation was in relation to the wires, one little fellow remarking that they were too high to hang clothes upon, whereat another suggested that they were put there for the little birds to sit on.

Their teacher's attempt to explain the use of the telegraph, while lucid enough to an adult mind, was beyond their comprehension, as was proved during noon recess, when the whole class were found squatting on the curbstone with their faces turned heavenwards, while they munched their luncheons. Their explanation was that they were watching to see the letters go over the wires.

These same children had never seen fruit nor vegetables growing, and took it for granted that everything they ate was made by some of the machines with the sight of which they were so familiar. Having never seen a live fowl, they had not the remotest idea where eggs were procured—unless they were manufactured at the corner grocery.

Some asked if milk was not white water, but as to its source of supply their knowledge did not go beyond the milkman's can. One small girl, who had once visited the country, told them she saw a man squeeze it out of a thing like a horse with horns and a long tail, but she added that she liked the milkman's milk the best.

Rarely having seen young animals other than a kitten

or a puppy, the unusual sight of a gawky, long-legged colt threw them into ecstacies of delight and wonder, and one child at once gravely inquired if it grew on a tree; but a companion laughed at him and informed him he had seen one made by a man down town.

A picnic to a park some distance out of the city was the first glimpse some of these children had ever had of the country; until then, the world, that is their world, and all it contained was the handiwork of men.

The growing trees and grass, the boundless blue sky, the clouds that floated overhead, the placid water of a miniature lake, were all objects of much wonderment to them. "Did a man stick the trees into the ground?" "Why do not the white things up there (the clouds) fall down?" "Where is the water hydrant?" "Can't I wade in the water?" "What is that thing in the water?" (A fish.) "Will it bite?" "Who made it?" "Where are its legs?" "What makes the ground green?" "Can I eat the green stuff?"

When two of their companions were drowned before their eyes, it appeared to make slight impression upon them; they had never seen death in that form and could not realize what it meant.

These city children early learned the value of money, and became adepts at trade and barter. No street-car conductor could impose upon them when it came to a question of dimes, nickels, and pennies. They appeared to have an instinctive understanding of addition and subtraction, and theirs was of the most practical kind of every-day arithmetic.

With more favored children the difference in observation and investigation is most marked. It is those who have had the freedom of orchard and field, who have grown as nature meant they should, that are the most observant and inquisitive regarding their surroundings. They realize there is some Power other than man behind these things which puzzle their small brains.

The children who have attended school two or three sessions are most prolific of questions, as a rule. They have begun to understand and acquire the ability to use the language common among their fellows.

No class of children have a greater reverence for all ceremonies of a religious nature or pertaining to religion than have the deaf and dumb; probably because they have never heard religion or religious matters discussed flippantly and ridiculed. None will follow their instructors more by faith and less by reasoning than will they.

Their belief in the greatness and goodness of God is sublime. Anything referring to the Creator or the unseen world appeals most strongly to them, and it is most frequently the theme which arouses in them the greatest desire for information. Unable to read or comprehend the Bible for themselves, they drink in every word that is read to them with a devotional fervor that is impressive. They are taught to keep the Sabbath day holy, and it is one of the things that they never forget in after life. The beautiful story of the crucifixion will hold them spell-bound, and when graphically told them by pantomime, will keep their interest until the close; it is a narrative of which they never tire. Indeed, all Bible stories have a great interest for them.

They are passionately fond of all kinds of stories, having been denied the solace of books and the pleasures of hearing; but as they grow older and acquire a command of language, to many of them books become of paramount interest and importance.

They can conceive Christ as having been a man, like men they see daily, but "What is God?" they ask. "Where is God?" asks another. "Who made God?" "What was God before He was God?" "Can you see God?" "Why can you not see Him?" "Can He see us?" "Has He eyes like us?" "If I am bad will God know it?" "Has he got a big book and does

he mark me if I am bad?" asked one urchin whose teacher kept a record in a book. "Where does He live?" "Why don't He fall down from the sky?" "Did you ever see God?" "Did God make me, you, everybody?" "How did He make us?" "Is God a man or a woman?" "Did He make everything; the houses, the trees, my clothes, my books?" "You said He made everything; but if He did not make the houses, my clothes, and my books, He did not make everything," one argued. "What is the sky?" "Are the clouds snow, cotton, feathers?" "Where is Heaven?" "Did I come from Heaven?" "Did you ever go to Heaven?" Why don't you go?" "Why can we not fly?" "What is a soul?" "Is my soul like my body; can my soul see?" "Why will not my body go to Heaven?" "Is it cold in the grave?" "What makes people die?"

Once, when a flower was used as an illustration of life, death, and the resurrection, a little girl exclaimed, "Yes, I know. We go to sleep; we are planted in the ground; then we grow and have wings and fly away to Heaven." At which explanation her companions nodded their small heads sagely. It happened that a short time afterwards the child lost a favorite brother, and when the sad news was told her, her grief was very great. Thinking to comfort her she was reminded of her illustration. The following autumn she returned to school in high spirits, and told her teacher that Willie had flown away to Heaven—she knew, for there was a hole where his grave had been. Death, though a great mystery to them, is not terrible; they ask many questions about it, but on the whole consider it only as a falling asleep.

"Shall I die?" "Will you die?" "What is death?" "Why must we die?" "What is an angel?" "Has an angel wings like a bird?" "Can an angel fly?" "Did you ever see an angel?" "Shall I have wings?" "Are my wings growing now?" (At this stage of the proceed-

ings there is usually a feeling of shoulder blades.) "Do angels eat things and wear clothes?" "Why don't you know?" (One little lad decidedly objected to Heaven, because he had been told there was nothing to eat there.) "Shall I hear and speak?" "How do you know?" Their desire to be able to hear and speak is very keen.

The smaller children's conception of Heaven appears to be colored by their local surroundings; they do not seem to be able to imagine a place where there are no clouds, rain, snow, and other phenomena to which they are accustomed.

While life is generally very full of happiness for them, they have no dread of its end. The death-bed of a deaf and dumb person is almost invariably the scene of a peaceful passing away, unless the end is accompanied by great physical agony, for they have been spared so many of the jarring discordances of life and the strifes that follow in their wake.

The fear of the moon has played considerable part in the early life of some of these deaf children. Not all are able to remember or to describe their dread of that object. But a young girl who retained a lively recollection of her early childhood gave some interesting information. One evening she discovered that the man in the moon was engaged in making faces at her, and she at once tried to outdo him at the trick; not succeeding, she became very angry.* For a long time afterwards she hated the sight of the moon and wasted much energy throwing stones at it; failing to drive it away, she tried to hide from it. The custom of the other members of the family, when reproving her, was to point upward and shake their heads sorrowfully, to signify that she would not go to Heaven if she was bad; they would then point downward and nod vigorously, signifying she would go to the other place. Of course she was unable to make them understand her

* Compare the recollections of Mr. d'Estrella, *Annals*, xxxv, 80.

aversion to that object above, so she always most vehemently protested that she would not go up, but she would go down. She had not the least idea what they meant; they on their part were mystified at her display of obstinacy. In her eagerness to discover what they so strongly disapproved of beneath, she made a point of investigating every well and other hole in the ground that she could find, with the result that she had some very thrilling adventures.

A small boy once declared the sun fell into the water when it set, and he spent hours waiting to see the water sizzle when the sun struck it, as he had seen a hot coal dropped into a bucket of water with that effect. The moon rising above the water was to him only the sun returned.

Some of these little ones have most beautiful ideas of the things which surround them. One child asked if the stars were angel's eyes winking at the people. A little colored boy called them "God's fire-flies"; another asked if they were windows in Heaven for God to look down through. Still another suggested they might be little lamps for the angels to see by as they flew up and down at night.

"God is angry and stamping on the floor," remarked a little boy when an unexpected crash of thunder startled him; he evinced no fear of the lightning which followed. To a small maid the rainbow was the ribbons the angels wore.

During the kite-flying season, a kite, belonging to a little fellow, became invisible, and his teacher was assured that now God knew he was a good boy because he had written it on his kite that went up to Heaven.

"Does God understand everybody?" one asked. "How can He see me think?" "What makes the grass green; sky blue; water blue; one flower red and another white?" "Why is an apple sweet and a lemon sour?" "Why do

not potatoes grow on trees?" "What is that red water that runs out when I cut my hand?" "What made it red?" "How did it get into me?" "Did I grow from the ground?" "Where did they buy the baby?" "Why has a baby no teeth or hair?" "How did the angels bring the baby?" "Was everybody a baby?"

Their observation is very keen, and they are quick to form conclusions, not always quite correct.

Their investigations as frequently lead them into trouble as normal children with abnormal bumps of curiosity, as exemplified by a small scamp whose meddling with a bumblebee's nest led him to declare they had pins inside of them; and a small woman who meddled with a wasp was very positive wasps had teeth, for one had bitten her.

Never having heard, they have no knowledge of sound, though some are so sensitive to vibrations as to mistake them for sounds. It has often been asked if the deaf ever dream of sound. It is an extremely rare occurrence even among those who have lost their hearing in childhood or youth. Waking or sleeping they seem doomed to an absolute silence. It would be equally interesting to know whether the congenitally blind ever see in their dreams and what can be their idea of color.

Those who have lost hearing, while having ears sealed to the sounds about them, live amidst others that memory has stored up. Every person who speaks has voice for them. The birds that flash through the air leave a whirr of wings, the leaves fluttering in the breeze rustle softly, the lapping of the wavelets on the shore swish-swash, and the ocean's waves roar and boom as they come tumbling up the beach; everything animate furnishes its quota of sound. The crash of a drum and the blare of trumpets are recalled by the sight of a band. In turning the leaves of a book fancy recalls the rustle that they make and a pen scratches in its rapid course over paper. A woman in silk skirts brings to mind the soft *frou-frou*.

They can hear the patter of the raindrops, the soft cooing of a happy child, the shouts of merry children, the sobs of the mourning, and the moans of the suffering. The bells that solemnly toll for the dead, or clang a wild alarum; those that tinkle, tinkle gently, or ding-dong with brazen tongues,—all these sounds and many others can be brought back, almost at will, by many who have once been permitted to hear. So merciful is memory; but in its magic echoes is there more of joy than pain?

SYLVIA CHAPIN BALIS,
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THE ELEVENTH CENSUS.—II.*

CONGENITAL AND ADVENTITIOUS DEAFNESS.

THE statistics concerning congenital deafness and the age when deafness occurred are much more complete for this census than for any previous one. Of the 40,562 persons reported as "deaf and dumb," 16,866, or 41½ per cent. of the whole number, are reported as congenitally deaf; 15,399, or 38 per cent., as not congenitally deaf but as having become deaf under five years of age; 3,262, or 8 per cent., as having become deaf between five and ten; 1,319, or 3 per cent., as having become deaf between ten and twenty; and 358, or 0.9 per cent., as having become deaf at twenty years of age and upward; while for 3,358, or 8 per cent., the age when deafness occurred was unknown.

Excluding those for whom the age when deafness occurred was not reported, the ratios for each of the above classes are as follows: congenitally deaf, 45 per cent.; not congenitally deaf, but deaf under five years of age, 41 per cent.; deaf between five and ten, 9 per cent.; deaf

* Continued from the June number of the *Annals*, page 247.

between ten and twenty, 3½ per cent.; deaf at twenty and upward, 0.9 per cent.

If the 145 persons reported as "congenitally deaf but not dumb" (see the June *Annals*, p. 241) were added to the category of the congenitally "deaf and dumb," their addition would not materially increase the ratios above given for that class. These ratios are low as compared with those found in other countries. The average ratio of congenital deafness given by recent censuses of twelve European countries, containing an aggregate of 100,326 deaf-mutes, was 74 per cent. These ratios are also lower than that of the census of 1880, which, out of 22,473 cases of deaf-mutism, reported 12,155, or 54 per cent., as congenitally deaf.

Among the "deaf and dumb" found in schools, the proportion of congenital deafness is still smaller than for the whole country. Though the total number reported (6,153) is comparatively small, the returns, which are compiled by the school authorities from their own records, are probably more accurate than those gathered by the census-takers. For each of the several classes above recorded the ratios of the deaf in schools are as follows: congenitally deaf, 42 per cent.; not congenitally deaf, but deaf under five years of age, 49½ per cent.; deaf between five and ten, 7½ per cent.; deaf between ten and twenty, 0.6 per cent.

If we add to the "deaf and dumb" found in schools the 721 persons in schools reported as "deaf but not dumb," only 145 of whom were reported as congenitally deaf, the ratio of congenital deafness in schools is still further reduced, being only 38 per cent.

Though the adventitiously deaf outnumber the congenitally deaf, the proportion of persons over thirty-five years of age is greater among the latter class than among the former. This indicates that the congenitally deaf have a lower death rate than the adventitiously deaf. For

the whole class of the "deaf and dumb" the death rate is very high for the ages from ten to thirty (17 per cent.), and very low for the ages from thirty to fifty (4 per cent.). The latter is ascribed by Dr. Billings, in part at least, to the immigration of deaf-mutes.

As in all previous censuses, it is probable that a large number of deaf-mutes under ten years of age are not reported. The proportion of the "deaf and dumb" under ten years of age reported is only 13½ per cent., while the proportion between ten and twenty years of age is 27 per cent. That they were not fully reported in 1880 is shown by the following comparison of the censuses of 1880 and 1890. "In 1880 there were reported 5,194 deaf-mutes as being under ten years of age. The survivors of this group should be found in the age group ten to twenty in the census of 1890, but in this age group we actually find 10,905. This would indicate either an enormous addition to the deaf-mutes by immigration, or a great deficiency in the count of deaf-mutes under ten years of age in 1880, which last is probably the true explanation of the discrepancy."

Of the 71,351 "deaf but not dumb," concerning whom the age when deafness occurred is given, 53 per cent., or over one-half of the whole number, were reported as becoming deaf between the ages of twenty and fifty years. For the other age periods the percentages were as follows: Under five years, 0.6 per cent.; five to ten years, 8 per cent.; ten to twenty years, 14 per cent.; fifty years and over, 24½ per cent.

CAUSES OF DEAFNESS.

Of the total 40,562 persons reported as "deaf and dumb," 16,866 were reported as congenitally deaf, and for 5,519 the cause of deafness was not stated. Of the remainder, 16,769 cases were ascribed to disease, 1,261 to

accident, and 147 to quinine. The assigned causes of deafness were as follows:

Inflammation and abscess of the ear	1,033
Other diseases of the ear	157
Smallpox	72
Measles	1,021
Scarlet fever	4,799
Diphtheria	222
Whooping-cough	361
Mumps	106
Malarial and typhoid fevers	771
Paralysis	132
Scrofula	337
Meningitis	3,278
Hydrocephalus	61
Other diseases of the brain	220
Diseases of the throat and air passages	1,354
All other diseases	2,845
Blows and falls	671
Other accidents	590
Quinine	147

Scarlet fever is the most frequently assigned cause for deafness, including more than one-fourth of the whole number for whom the causes are reported. Next comes meningitis and hydrocephalus, being about 18 per cent. Other percentages are: Diseases of the throat and air passages, 7½ per cent.; measles, 5½ per cent.; malarial and typhoid fever, 4 per cent.; scrofula, 2 per cent.; whooping-cough, 2 per cent.; diphtheria, 1 per cent.; mumps, 0.6 per cent.; accidents, 7 per cent.

In the returns from the schools for the deaf, the proportion of cases assigned to meningitis and hydrocephalus (33 per cent.) is greater, while for scarlet fever (18 per cent.) it is less than those for the "deaf and dumb" of the whole country.

Comparing the causes assigned for deafness among males and females, scarlet fever, measles, whooping-cough, scrofula, and smallpox are reported to have caused a greater proportion of cases among the females than among the males, while meningitis and hydrocephalus caused a greater proportion of cases among the males than among the females.

The proportion of cases due to scarlet fever was about the same in 1890 that it was in 1880, while the proportion of cases due to meningitis and hydrocephalus was strikingly less than in 1880. The proportion of cases due to diseases of the throat and air passages, inflammation and abscess of the ear, measles, scrofula, diphtheria, quinine, and mumps was greater in 1890 than in 1880.

The proportion of cases due to scarlet fever was much greater for the whites than for the colored population. The proportion of cases due to accidents was much greater for the colored than the whites.

For the 80,616 "deaf but not dumb" the cause of deafness was reported as unknown for 24,730, as congenital for 145, as caused by disease for 40,523, by accidents and injuries for 6,729, as resulting from military service for 7,484, and as due to quinine for 1,005. The percentages of the various diseases assigned as causes for the "deaf but not dumb" differ much from those assigned for the "deaf and dumb." Diseases of the throat and air passages stand highest in the list (14½ per cent.), and malarial, typhoid, and other fevers come next (8½ per cent.); scarlet fever is assigned as the cause for 7½ per cent. of the cases, and meningitis and hydrocephalus for 0.7½ per cent. Accidents account for 12 per cent. and military service for 13½ per cent.

THE DEAF IN SCHOOLS.

On the day the census was taken (June 1, 1890), 6,153 "deaf and dumb" and 721 "deaf but not dumb" were

found in schools for the deaf, making a total of 6,874 deaf persons at school. This is less than the number reported in the *Annals* as having been present at school on December 1, 1889 (7,331), in which, moreover, the pupils of two schools were not reported, and it is less than the number reported in the *Annals* as present December 1, 1890 (7,546), in which the pupils of one school were not reported. This discrepancy is partly due to the fact that only the pupils of residential schools or institutions are included in the census returns; those of day-schools are ignored. From several of the schools, also, some pupils seem to have dropped out in the course of the year, so that though they were present December 1, 1889 and 1890, they were absent June 1, 1890.

Dr. Billings gives the following table as showing for the United States the total number of the "deaf and dumb," the number between five and twenty years of age, the number in schools, the ratio of the number in schools per thousand of the total deaf and dumb, and the ratio of the number in schools per thousand of those between five and twenty years of age, with distinction of sex and color:

Sex and color.	Total deaf and dumb.	Deaf and dumb between 5 and 20 years.	Deaf and dumb in schools.	Ratio of deaf and dumb in schools to 1,000 of total deaf and dumb.	Ratio of deaf and dumb in schools to 1,000 between 5 and 20 years.
Total	40,562	15,371	6,153	151.69	400.30
Male.....	22,411	8,465	3,470	154.83	409.92
Female .. .	18,151	6,906	2,683	147.82	388.50
White	37,447	13,943	5,910	157.82	423.87
Male.....	20,639	7,658	3,307	160.23	431.84
Female	16,808	6,285	2,603	154.87	414.16
Colored.....	3,115	1,428	243	78.01	170.17
Male.....	1,772	807	163	91.99	201.98
Female	1,343	621	80	59.57	128.82

If the 721 "deaf but not dumb" who were in the institutions in 1890 and the pupils of the day-schools were added to the statistics of the above table, as they ought to be, the showing would be more favorable for the state of the education of the deaf in America, but the figures would still indicate that only about half the deaf between five and twenty years of age were at school in 1890. It should not be concluded, however, that all the remaining half were left to grow up in ignorance. Some had doubtless completed a course of instruction lasting several years before 1890, and some who were to receive such a course later had not yet entered upon it. To expect to find them all in school at one time would be to expect them all to have a fifteen years' course of instruction. That less than one-fifth of the colored "deaf and dumb" between the ages of five and twenty were at school shows a lamentable lack of education among this portion of the deaf. The greatest proportion of the children of school age found in schools for the deaf was among those of Irish descent, being about 66 per cent. For those of the whites whose mothers were born in the United States the proportion was about 40 per cent.; for those whose mothers were born in England and Wales, 49 per cent.; for those whose mothers were born in British America, 34 per cent., and for those whose mothers were born in Germany, 45 per cent.

THE DEAF IN CITIES.

It is sometimes asserted that the deaf tend to congregate in large cities, and this supposed tendency has been ascribed to the feeling of "clannishness" produced by their education in special schools, the use of the sign-language, etc. According to the Census of 1890 this tendency does not exist. The ratio of "deaf and dumb" found in cities containing 50,000 inhabitants and up-

wards was 487 per million of the population, being 527 for the males and 447 for the females. "This is considerably below the rate for the whole country, and indicates that there is no special tendency to the aggregation of deaf-mutes in large cities, but rather the reverse. They are more frequent in small towns and rural districts."* The ratios vary greatly for the different cities, ranging from 998 per million in Columbus, Ohio, to 197 in New Haven, Connecticut. The variations are probably largely due to the varying opportunities for remunerative employment suited to the deaf in the different cities.

The "deaf but not dumb" persons in large cities numbered 830 per million of population, being 840 for the males and 820 for the females. This was also much below the average for the whole country, which was 1,291 per million. A comparative table giving the ratios of the "deaf and dumb" and the "deaf but not dumb" in all cities of 100,000 inhabitants and upwards, side by side, shows that there is no correspondence in magnitude between the ratios to population of these two classes in the several cities.

OCCUPATIONS.

The occupations of 14,474 male, and 9,969 female "deaf and dumb," 15 years of age and upwards, are reported. The following table shows the number of males reported for the principal occupations, with distinction of color:

* The same fact was shown by the Census of 1880.

Occupations.	White.	Colored.
Artists and photographers	29	
Bakers and confectioners	26	
Bookbinders	18	
Brick and stone masons	9	
Carpenters and cabinet-makers	547	6
Cigarmakers	113	
Clergymen	18	
Clerks	113	
Coopers	60	
Editors	13	
Engravers and jewelers	41	
Farmers	3,207	129
Fishermen	18	4
Gardeners	47	5
Laborers and farm laborers	3,154	554
Lawyers	12	
Manufacturers	41	
Machinists	64	
Mechanics	181	
Merchants	84	
Mill and factory operatives	129	8
Miners	74	
Painters	168	
Peddlers	33	
Physicians	16	
Printers and compositors	274	3
Railroad employees	15	
Sailors	10	
Servants	40	49
Shoemakers	490	13
Students	2,296	108
Tailors	140	
Teachers	93	
All others	1,886	136
Total	13,459	1,015

The following table shows the number of females reported for the principal occupations, with distinction of color:

Occupations.	White.	Colored.
Artists and photographers	13	.....
Bookbinders	21	.....
Cigar makers	8	.....
Clerks	6	.....
Dressmakers	228	4
Fancy work and millinery	41	.....
Farmers	44	14
Housekeepers	624	33
Housewives	3,221	60
Laborers and farm laborers	62	216
Laundresses	40	29
Mill and factory operatives	73	.....
Physicians	3	.....
Printers and compositors	13	.....
Seamstresses	109	5
Servants	1,885	166
Shirt makers	3	.....
Students	1,590	57
Tailoresses	66	.....
Teachers	60	.....
All others	1,179	96
Total	9,289	680

Among the congenitally deaf there were 7 clergymen, 31 clerks, 3 editors, 2 lawyers, and 50 teachers.

Of the white males, 23 per cent. were laborers and farm laborers; of the colored, 55 per cent. Of the white females, 7 per cent. were laborers and farm laborers; of the colored, 32 per cent.

Of the occupations of the "deaf but not dumb" no report is given.

LITERACY AND ILLITERACY.

Of the 33,812 "deaf and dumb" five years of age and upwards, with respect to whom statistics of literacy and illiteracy were returned, 24,715, or 73 per cent., could

read and write, 649 could read but not write [?], 8,391, or 26 per cent., could neither read nor write, and 57 could read, but the facts as to writing were not known.

The illiteracy was greater among the congenital (32 per cent.) than among the non-congenital (19 per cent.), among the colored (70 per cent.) than among the whites (22 per cent.); among the females (27 per cent.) than among the males (24 per cent.); among those of advanced age (for example, of whites 65 years of age and upward, 32 per cent.) than among the younger (of whites from 15 to 25 years of age, 16 per cent.).

For the "deaf but not dumb" no statistics of literacy and illiteracy are given.

CONJUGAL RELATIONS.

There were a good many questions on the schedules of the census enumerators relating to the conjugal relations of the deaf and the results of their marriages, but the returns, owing probably to the difficulty of obtaining the information desired and the indifference and carelessness of the enumerators, were unsatisfactory. Comparatively little of the information gathered is given in the published report. There is a table showing the number of the "deaf and dumb" in the United States in 1890 of fifteen years of age and upward in each of certain age groups, who were single, married, widowed, or divorced, with distinction of congenital and non-congenital deaf-mutes, and of sex, color, and nativity.

Of the "deaf and dumb" fifteen years of age and upward whose conjugal condition was reported the total number was 29,621, of whom 16,461 were males and 13,160 were females; 27,557 were white and 2,064 colored; 11,913 were congenital deaf-mutes, of whom 6,528 were males and 5,385 females.

Of the 5,844 white male congenital deaf-mutes reported

4,130 (70½ per cent.) were single, 1,549 (26½ per cent.) were married, 154 (2½ per cent.) were widowed, and 11 (0.2 per cent.) were divorced. Of the 8,071 white male non-congenital deaf-mutes 5,412 (67 per cent.) were single, 2,458 (30½ per cent.) were married, 181 (2¼ per cent.) were widowed, and 20 (0.2½ per cent.) were divorced.

Of the 4,860 white female congenital deaf-mutes 3,306 (68 per cent.) were single, 1,252 (26 per cent.) were married, 293 (6 per cent.) were widowed, and 9 (0.2 per cent.) were divorced. Of the 6,366 white female non-congenital deaf-mutes 4,007 (63 per cent.) were single, 1,935 (30½ per cent.) were married, 402 (6 per cent.) were widowed, and 22 (0.3 per cent.) were divorced.

It appears from the above statements that the proportion of the married is greater among the adventitiously deaf than among the congenitally deaf.

Among the colored population the proportion of marriages is less than among the whites, being for the male congenital deaf-mutes 14½ per cent., for the male non-congenital 20 per cent., for the female congenital 13 per cent., and for the female non-congenital 13 per cent.

In each 10,000 single white males of the general population between fifteen and forty-five years of age there were 4.59 congenital deaf-mutes and 6.57 non-congenital deaf-mutes, or 11.16 in all, while in the same number of those 45 years of age and upward there were 18.87 congenital deaf-mutes and 14.82 non-congenital, or 33.69 in all. Of each 10,000 married white males between fifteen and forty-five years of age, 1.28 were congenital deaf-mutes and 2.23 non-congenital deaf-mutes, or 3.51 in all, while of each 10,000 married white males forty-five years of age and upward, 1.92 were congenital deaf-mutes and 2.76 were non-congenital deaf-mutes, or 4.67 in all.

No information concerning the conjugal relations of the "deaf but not dumb" is given.

DEAF RELATIVES.

Out of 25,471 of the "deaf and dumb" concerning whom reports were made as to the possession or non-possession of deaf relatives, 15,057, or 60 per cent. of the total reported, had such relatives. The proportion having deaf relatives was much greater among the congenitally deaf than among the adventitiously deaf. Of 14,039 congenital deaf-mutes, 10,108, or 72 per cent., had deaf relatives, while of 11,432 non-congenital deaf-mutes, 4,949, or 43 per cent., had deaf relatives. The proportion of the whites having deaf relatives (congenital cases, 74 per cent.; non-congenital, 44) was much greater than of the colored (congenital cases, 43 per cent.; non-congenital, 25).

The following table shows the numbers of the congenitally and non-congenitally "deaf and dumb," respectively, reported as having certain classes of relatives, and the percentage of each class to the total number reported:

	Congenital.		Non-congenital.	
	Number.	Percentage.	Number.	Percentage.
Had deaf fathers	722	7.1	504	10.2
" " uncles	408	4.0	205	4.2
" " mothers	256	2.5	182	3.7
" " grandfathers	171	1.7	140	2.8
" " grandmothers	538	5.3	372	7.5
" " aunts	446	4.4	307	6.2
" " cousins	682	6.8	556	11.2
" " brothers	3,296	32.6	1,254	25.3
" " sisters	3,029	30.0	1,116	22.6
" " sons	200	2.0	133	2.7
" " daughters	183	1.8	115	2.3
" " relatives not specified.	177	1.8	65	1.3
Total	10,108	100.0	4,949	100.0

In 2,158 cases it was reported on which parental side the deaf relatives were. The following table shows the

numbers and percentages of relatives reported for the father's side and mother's side respectively:

	Congenital.		Non-congenital.	
	Number.	Percentage.	Number.	Percentage.
Had relatives on mother's side	422	31.0	212	26.6
Had relatives on father's side	761	56.0	521	65.3
Had relatives on both sides	177	13.0	65	8.1
Total	1,360	100.0	798	100.0

No information concerning deaf relatives of the "deaf but not dumb" is given.

CORRELATION OF DEAFNESS WITH OTHER MISFORTUNES.

The following table shows the number of persons who were reported as afflicted with other misfortunes in addition to deafness. As there is a marked difference in some of these numbers for the years 1890 and 1880, we give the returns of both censuses:

Conditions.	1890.	1880.
"Deaf and dumb" and blind	259	246
" " insane	409	268
" " feeble-minded	1,373	2,112
" " blind and insane	62	30
" " " " feeble-minded	137	217

It will be observed that in the number who were reported as "deaf and dumb" and feeble-minded there is a marked decrease from 1880 to 1890, while in those reported as "deaf and dumb" and insane there is a marked increase. The numbers of the "deaf and dumb" and the blind are not essentially changed. Dr. Billings regards

the figures of both censuses as too small and the liabilities of errors in them as too great to permit of any deductions of value. He thinks, however, that there really was an increase in the number of those who were "deaf and dumb" and insane, while the decrease in the number of the "deaf and dumb" and feeble-minded may have been partly due to a more defective enumeration of these complicated cases in 1890 than was made, with the help of physicians, in 1880. Our own opinion is that the more explicit instructions to enumerators in 1890 led to the erroneous inclusion of fewer cases of the merely feeble-minded as both "deaf and dumb" and feeble-minded than in 1880.

Another circumstance bearing upon the correlation of deafness with blindness and feeble-mindedness is brought out in a table showing the ratio of the white congenitally "deaf and dumb," the white congenitally blind, and the white congenitally feeble-minded in each State and Territory of the United States. It appears from this table that in a general way the ratios of these classes increase or decrease together in the several States, though there are some marked exceptions to the rule, as for example in Vermont, where the proportion of the feeble-minded was highest of all, while it was fifteenth in the order of the magnitude of its proportion of the "deaf and dumb," and had but a medium proportion of the blind. Virginia and North Carolina stood highest in the ratio of the "deaf and dumb," and among the highest in the ratios of the blind and the feeble-minded. The States and Territories west of the Rocky Mountains had the lowest ratios of all three classes.

E. A. F.

THE FIFTH YEAR'S WORK.*

II. NUMBER.

The work of this year will be fractions, varied by denominate numbers, numeration and notation.

Fractions.

THE objects that I have found most useful in explaining the different operations with fractions are the papers cut into perfect circles furnished by dealers in kindergarten supplies. Get those about four inches in diameter and have a large supply, several hundred, all of the same size. They are very cheap and may be used freely.

The reason why I use a circle is that if we cut it through the center, into any number of equal parts, even as many as eight, the eye, with very little training, will readily recognize any one of them, and assign it to its true value.†

Another reason for using the circle is that we can very easily and rapidly make pictures of its segments which will be easily recognized, and which can be used in connection with figures in a fractional form. After awhile we can substitute figures for these hieroglyphics, and get the conventional form of written fractions, which our pupils will then clearly understand.

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* Continued from the last number of the *Annals*, page 315.

† No claim of originating this method is made by the writer. Very similar methods will be found outlined in several works on arithmetic, some of them quite old. Probably Mr. Booth, of the Philadelphia School, first publicly explained to teachers of the deaf a system of fraction teaching founded on the use of paper disks, although his method, as I understand it, differs widely from the one given here. Mr. Booth, says:

"I take this, a circle, as my unit, because the arc of a circle suggests the unit. I take this in preference to a straight line, simply because there is no way of determining whether the straight line is a whole line or a half line. A straight line does not suggest a unit."

Begin by showing one of the disks, and cutting it exactly in half. Show that the two halves are equal. Write on the black-board:

A half: ◻. One-half: $\frac{1}{◻}$.
Two halves: ◻◻. Two halves: $\frac{2}{◻}$.

Explain that in these latter expressions the pictured part — ◻ — shows what it is, and the figures, 1, 2, etc., show how many.

Ask: How many halves in one?

Give each pupil a disk and let him cut it and find out for himself.

Write: Two halves: $\frac{2}{◻}$.

Explain that the figure 2 shows how many and the pictured part that they are halves.

Go on with exercises in the same way, asking: How many halves in two? Three? etc.

At first let every pupil cut the given number of disks into halves and find out for himself, but after a little you need only call up one pupil, and let him do the cutting and counting where the others can see it done. It will be well if you have taken the pains beforehand to rule a number of the disks lightly so that the children can make the cuttings accurately, without the loss of too much time. This is still more important when you come to such fractions as a third, a fifth, and a seventh.

Ask your pupils to show you a whole disk and a half-disk. Tell them you write this

One and a half: $1\frac{1}{◻}$.
Two and a half: $2\frac{1}{◻}$.

Ask again: How many halves in one? In one and a half? In two? In two and a half? etc., etc.

Have them answer: Two halves: $\frac{2}{◻}$. Three halves: $\frac{3}{◻}$, etc.

Ask: How many whole ones in two halves? In four

halves? In six halves? etc. Let each pupil take the given number of half-disks, and put them together and see for himself. After a little, one pupil may do the work while the others look on.

Ask: How many whole disks in three halves? Give each pupil three halves and let him work it out and see. Some of them will do so at once and without any help or suggestion. Show them how to write the answer:

One and a half: $1\frac{1}{2}$.

Proceed to the addition, subtraction, multiplication, and division of halves, giving many problems like the following, and having each one worked out with the paper disks:

John has five halves, and I give him three halves: how many has he?

Let John show how many halves he has. Give him the three halves, so that all can see them. Then let him see how many whole ones he can make of the eight halves. The work on the slate may be done like this:

John has $\frac{5}{2}$.
You give him $\frac{3}{2}$.
He then has $\frac{8}{2} = 4$.
He has four whole ones.

Henry has two and a half, and I give him three and a half: how many has he then?

Henry has $2\frac{1}{2}$.
You give him $3\frac{1}{2}$.
He has then $5\frac{2}{2} = 5$ and $1 = 6$.
He has six whole ones.

In working out this problem, let him have two whole disks and a half-disk. Then give him three whole ones and a half-one. Make him first count the whole disks and

see how many he has; and then see how many halves he has, and how many wholes can be made from them.

The method of teaching subtraction does not need particular explanation. Follow the general plan of at first subtracting from an improper fraction and then from a mixed number, still using the disks and our system of notation. There may be some hesitation when you ask your pupils to take a mixed number or a fraction from a whole number; but it can be easily overcome by suggesting that they can cut one of their whole ones into halves and then subtract, or rather actually take away what they need.

In multiplication and division act the problems out with your disks and half-disks, and then make the half-disks into whole ones. Detailed directions are not necessary.

Next you must ask such questions as: What is one-half of seven? Take seven whole disks and lay them in a row. Tell them you wish to cut them in half, and find out how many there are in each half. Do so. Show them the seven halves. Write: One-half of 7 is $\frac{7}{2}$. Ask how many whole ones are in 7 halves, and let them put them together and see. Show them that you actually do have the same number of half-disks—seven—in each half.

Show them farther that they need not cut each of the seven whole disks into halves, but that they can put one in one place, and another in another place, till they get to the last whole one, which must be cut in half to make an equal division.

Our next step will be to teach them to find three-halves, four-halves, etc., etc., of any number.

What is five times one-half of three? Write the question in this form for the first few times, and afterwards explain that it means the same as: What is five-halves of three?

Ask them to find one-half of three. When they have done so, point to the words "five times," and tell them to

repeat the operation until they have done so five times. Then let them count and see how many they have in all. The example may be done in writing thus:

$\frac{1}{\square}$ of 3 = $\frac{3}{\square}$ = $1\frac{1}{\square}$

5 times

$5\frac{5}{\square}$ = 5 and $2\frac{1}{\square}$ = $7\frac{1}{\square}$.

You will have very little trouble from pupils attempting to add the numerator of the fraction to the whole number. They see the idea back of the figures, and see it clearly. If they do not, go back to your disks and half-disks, and make each pupil perform the operation with them.

After you get this far lay aside the disks for awhile, and use your cardboard objects, pieces of string, crayons, sheets of paper, measured lines, toy money, any and everything that you can divide or cut into two equal parts, and so give variety to your examples, and destroy the idea, which possibly some of them may begin to form, that round pieces of paper are the only thing to which fractions apply.

Take up thirds and go through with them in the same way that you did with halves. Take a disk and carefully cut it into three parts. Show that these are equal, that three of them exactly make a whole disk, and that a third differs from a half. Gather all the half-disks you have, and put them away for the present.

Tell them the name of the new fraction.

A third $\diamondsuit$. One-third $\frac{1}{\diamondsuit}$.

Go through all the principles you have taught with halves, using thirds in the same way. However, as it is much harder to divide many things into thirds than it is into halves, make your exercises with promiscuous objects less numerous. Your children will not need nearly so many, as they will understand that as all the principles they learned from the disks about halves were true of

other things, so it is with those they learned about thirds.

Teach fourths in the same way. Give them the expressions.

A fourth, a quarter ▢. One-fourth, one-quarter $\frac{1}{▢}$. Use the names—fourths or quarters—often. Make them show you a fourth, and then a quarter. Tell them it is exactly the same thing, always, but has these two names. Hearing people are about as apt to use one as the other.

When you have finished the same course with these that you did with halves and thirds, you must take a step in advance. Take a whole disk and cut it in half. Ask the name of each piece. How many halves in one? Cut each of these halves into two equal parts. Ask the name of each piece. If they cannot tell you, show one of the quarters which you had before. Ask: How many quarters in a whole one? How many in a half? If we take away one, how many will be left? How many quarters in two halves? In three? etc. How many halves in two fourths? In four? etc.

After considerable drill on such questions, ask one like this:

John has one-half and I give him one-fourth. How many has he, then?

If you actually give him the things he will know how many he has, but will be puzzled to express his knowledge; but the suggestion that he cut the half into quarters will enable him to see that three-quarters is the right way to express what he has. Tell your pupils that whenever they add or subtract halves and quarters, they must always cut the halves in two, or change them to quarters. Lead them to see that in all these cases they will have exactly twice as many quarters as there were halves. Give them a large number of examples illustrating this, such as:

Henry has one and one-fourth disks, John gives him three and a half, and I give him one and three-fourths; how many has he?

The written solution of this would be:

Henry has $1\frac{1}{\square} = 1\frac{1}{\square}$
John gives him $3\frac{1}{\square} = 3\frac{2}{\square}$
You give him $1\frac{3}{\square} = 1\frac{3}{\square}$

He has $5\frac{6}{\square} = 5$ and $1\frac{2}{\square} = 6\frac{1}{\square}$.

Examples in subtraction must be solved in the same way. If you illustrate each step by actually doing with your disks what you do on the slate, you will have no trouble. At the risk of being too simple I will tell exactly what I would do with the disks, when explaining the last problem.

"Henry has one and one-fourth disks."

Let Henry take one whole disk, and a quarter-disk, and show them to the class.

"John gives him three and a half."

Let John come and give him three whole disks and a half-disk, letting every one see them. Tell Henry that as he already has a quarter, he should cut this half-disk into quarters. Let him show the two quarters he gets from the half.

"I give him one and three-quarters."

Be sure that you give him three-fourths, and not a quarter and a half. Then ask him how many whole disks he has. Let him show the five to the class. Ask how many quarter-disks he has, and let him show them. How many whole ones can he make of these quarter-disks? Have him build it up and put it with the five whole ones. Call attention to the fact that there are now six whole ones and two quarters. Ask what they can make of the two quarters, and let all see that the final result is six and a half.

As a final exercise on fourths, have them cut from whole disks a fourth, a half, two-fourths, two-halves, three-fourths, three-halves, etc; cutting them in as large pieces

as they can, and always observing that any number of halves is twice as large as the same number of fourths.

In teaching fifths cut a pattern from thin cardboard. It will be better to have this a circle of the size you are using, with an exact fifth part cut out of it, rather than a fifth part of such a circle. The only other point is that for the sake of clearness we will always write our sign for a fifth— ◺. We have always turned the fourth the other way, and by turning the fifth this way it will always be plain, even if we sometimes happen to make it a little larger than it ought to be.

To begin to teach sixths, hold up a disk, and ask what each part is called when you cut it into three equal parts. How many parts will there be if I cut each of these three parts into two equal parts? What is each part called? If I take away one, how many will be left? Two? etc., etc.

Go through exercises similar to all those which you had on halves. When you finish these, compare sixths and thirds, as you did quarters and halves. Give examples in addition and subtraction, but, for the present, do not give examples in which the results will reduce to halves.

After a few of these, compare in the same way sixths and halves. Give a few examples of their addition and subtraction. Then compare sixths, thirds, and halves. Show that all of these can be changed into sixths, because we can always cut a half into exactly three-sixths. Therefore we can always add and subtract halves, thirds, and sixths by changing all of them to sixths. We cannot cut a fourth or a fifth into an exact number of sixths.

Sevenths should be explained and illustrated in the same way that fifths were.

When we come to eighths, begin with the whole disk. Cut it into halves, then into quarters, and these into eighths. After going through the same drill as we did with halves, compare eighths and fourths, and add and

subtract. Then do the same with eighths and halves, and afterward with all three. Show why we can always change halves and quarters to eighths, and give some practice in so changing them. Show that thirds, fifths, sixths, and sevenths cannot be changed into eighths, because we cannot cut any one of them into any number of exact eighths. After this give some practice in the addition of halves, quarters, and eighths.

We have now carried our system of illustration by objects and our peculiar notation as far as either will be helpful. We may occasionally find it necessary, especially when we introduce a new fraction or a new operation, to go back to the disks and illustrate, but we will not have to do this very often, because our children have the habit of thinking of fractions as things, and have a clear mental image of them. Begin a general review of the whole subject. Ask how many halves there are in one whole. When they answer "two," tell them that we have used the character $\frac{1}{\square}$ to represent a half, but that now they know so much about halves, that we are going to change. Instead of writing $\frac{1}{\square}$, which means that a whole one has been cut into *two* equal parts, we will use the expression $\frac{1}{2}$, which means the same thing, the figure 2 showing how many parts the whole one was cut into. In the same way show that we can write $\frac{1}{3}$ instead of the pictorial expression we have been using, because in this case we cut the whole one into three equal parts; and so of each of the other signs we have used. The figure under a line, always shows how many equal parts we cut some whole thing into, and the figure over the line tells how many of these parts we take. Give some practice on these changes by making your pupils show you the proper part of a disk for written fractions, such as: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{4}$, etc., etc.

Ask a question, such as:

What part of eight is two?

Most likely your pupils will not be able to answer this

at first. If they do, it will probably be because they happen to remember from some former exercise that "one-fourth of eight is two," and not because they have reasoned it out now. Ask: What part of eight is one? Take a whole disk and eight counters. Tell them to divide the disk into eighths, and to put on each of these eighths one of the counters. The whole disk will then represent eight. What part of the whole eight is one? What part of the whole disk is one of the parts with one counter on it? Now we can try the first question. One is one-eighth of eight. Two is two times one. Two is two times one-eighth of eight, or two-eighths of eight. But two-eighths of the disk (showing them) are what part of it? One-fourth. Then two-eighths of eight are one-fourth of eight. Give enough of such problems to have the pupils solve them easily and quickly.

Review all the ground you have been over. Explain that when the portion of a disk representing one fraction can be exactly cut up into another we can change it to that other denomination, and that this will always be true when the denominator of the first fraction will exactly divide that of the second. Give a good deal of drill in thus changing fractions back and forth.

Carefully explain the denominators of fractions, one at a time, as far as twentieths, or possibly twenty-fourths. As each is given, make the pupils show by objects or by drawing the value of the different fractions, such as: $\frac{4}{9}$ of a disk, $\frac{3}{10}$ of a sheet of paper, $\frac{7}{11}$ of a line, $\frac{7}{12}$ of a foot, etc, etc.

Give examples in the addition and subtraction of these fractions, with such as will reduce to the same denominator any that you have taught, as often as you can.

After this ask your pupils to add one-half and one-third. This will probably puzzle some of them, because they cannot change a half to thirds. Ask them, then, to add $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$. They ought to be able to do this. If

they cannot, ask them if they can change the half and third to sixths. If they do not then catch the idea, get out your disks and explain as you did before, showing that all these fractions can be changed to sixths, and then added. Then ask them again to add $\frac{1}{2}$ and $\frac{1}{3}$, and suggest that all they have to do is to leave out, in the example they have just done, all about the $\frac{1}{6}$. After they have finished show them that if they multiply the denominators together they will get the proper denominator; and also that the new numerators come from multiplying the numerator of each fraction by the denominator of the other.

Then ask them to add $\frac{1}{2}$ and $\frac{2}{3}$. Show them again that if each of the terms of each fraction be multiplied by the denominator of the other they will get the proper fractions to add, each having the same denominator.

Proceed to add thirds and fourths. If necessary, show them by objects that $\frac{1}{3}=\frac{4}{12}$ and $\frac{1}{4}=\frac{3}{12}$. Give a number of examples, both in addition and subtraction, and then bring in halves. Add and subtract, using all three often. Continue in this way until you have taken all the fractions as high as tenths or twelfths. I should not, however, at present, give examples that required a common denominator greater than twenty-four.

To multiply one fraction by another, begin by asking: What is one-half of one-half? Have a half-disk actually cut in two. What is $\frac{1}{2}$ of $\frac{1}{3}$? $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{2}$ of $\frac{2}{3}$, etc. Have a number of these questions fully worked out with objects, and immediately afterwards on the slate. Point out that the result is always the same as if they multiplied denominators by denominators, which is the same as dividing one fraction into as many equal parts as there are in the denominator of the other, and then multiplied the numerators, which is taking as many of those equal parts as there are units in the numerator of the other fraction.

Give some examples of the form: $\frac{1}{2}$ of $\frac{4}{5}$ of $\frac{5}{6}$, etc. At first have these multiplied out in full. Afterwards show them how to cancel. Impress upon your pupils that they cannot do this in addition and subtraction. Show them also how to reduce a fraction to its lowest terms. These operations can all be explained by disks, if you choose to do so, but it is hardly necessary.

The division of fractions should be carefully explained by questions and by cutting disks. How many times $\frac{1}{2}$ in 1? 1 divided by $\frac{1}{2}$ is how many? How many sixths in one? In one-half? In one-third? How many times $\frac{1}{6}$ in 1, etc.? 1 divided by $\frac{1}{6}$ is how many? etc., etc.

Show them that if they invert the divisor and multiply they will get the same result as they actually do by measuring off the divisor on the dividend and counting. You may, if you wish, show by objects that $\frac{8}{5} \div \frac{2}{4} = \frac{4}{5}$, but it will probably worry you, and be hard for your children to grasp. I should most certainly not try to do so. Do not give many such examples, and if you do, tell your children to follow the rule, awaiting greater development of the reasoning powers before trying to explain this.

I would also, perhaps, show them that complex fractions are simply a way of expressing the division of one fraction by another. These awful looking expressions seem to have a strange fascination for some children, and if you have any such in your class, it may be well to lift the veil from the mystery; but I should spend very little time in teaching them now, and in fact should here end the teaching of fractions for the present.

Denominate Numbers.

You need not wait to begin denominate numbers until you have finished fractions. I hope that you have already shown your pupils many of the weights and measures that

are in common use. After you get a good start in fractions, denominate numbers may be used to practice on, or as a change. I must insist very urgently upon your giving your pupils an intimate personal knowledge of these measures, weights, etc., or at least with one or two units in each table. Let them see for themselves that two pints make a quart, six inches are in half a foot, sixty seconds in a minute; that there really are sixteen ounces in a pound, that a quart dry measure and a quart liquid do not mean exactly the same thing.

Our children already know something of United States money, but I should begin and develop the table from the beginning. Use real coins for the first few lessons. Afterward the toy object money that is supplied by dealers in kindergarten supplies will do very well. Your children already know, or will understand by only a word of explanation, that these bits of pasteboard only represent money just as the cardboard pictures we used before represent things.

Show some pennies. Hold up one and ask its name. If the children say "Money," show them a number of different coins and bills, and tell them that all of these are money. If they say "a penny," ask for another name, and get them to say "a cent." Ask them to write it. Ask them how many you show, and get them to write: "A cent," "one cent," "1 ct.," and ".01." You will probably have to show them how to write this last expression. Explain it simply as a way of writing cents, and not as a decimal fraction.

Show two pennies, three pennies, etc., and have them write the different expressions. Continue till you get to ten pennies. Then show them a dime. Tell them its name and ask its value. They know this. Give some exercises, having them tell you how many cents in a certain number of dimes and pennies, as: "How many cents in 4 dimes and 2 pennies?" Show them the money,

and have them write: "42 cents," or .42. Call their attention to the similarity between dimes and the bundles of toothpicks we used before. Tell them that in speaking of money we never say "dime" or "dimes," except when we mean a silver coin. We say: "Can you give me five dimes for a half-dollar?" meaning that we want the large coin changed for five small ones; but we do not say: "A straw hat costs five dimes." Write on a card and hang up where they can always see it:

10 cents (marked "•") make 1 dime.

Show ten dimes and ask how many cents in them. Show a dollar and ask how many cents in that, and also how many dimes. If your pupils do not know the answer to either question, tell them one, and make them work out the other. Ask how we write one dollar, and get all three expressions "1 dollar, $1., $1.00." Explain that this last expression really means: one dollar and no cents.

Practice your pupils in writing amounts such as: a dollar and three cents, a dollar and fifteen cents, a dollar and seventy-five cents, six dollars and two cents, etc., etc. Make them tell you how many dollars and how many cents in such amounts as: three hundred and forty-five cents, etc., etc. Call attention to the fact that if we say dollars instead of hundreds we change these at once to the correct form. In using figures to express money we always put exactly two figures after the decimal point, or else none at all. If there are less than two figures needed to express the amount we wish we must put the figure 0 before the one we use; as: 7 cents = .07, never .7. Practice on this. Take down your card and write on it:

10 dimes = 100 cents make 1 dollar (marked $.) Your table of United States money is finished as far as you will have any use for it for the present.

Teach the names and values of the other coins—two-cent piece, five-cent piece or nickel, quarter or quarter-dollar, half or half-dollar; and impress very strongly on

their memories by constant repetition the values of the fractional parts of a dollar. Use what you teach in your number-work constantly.

As you feel the need of variety in your work, take up the other tables. Take dry measure first. Have real measures, and let the pupils do the measuring themselves. Sawdust and sand, if clean, are both good things to measure, but if the work must be done in the school-room they make a great litter, so that possibly beans, oats, or even shoe-pegs might be better, but probably the best and most convenient way will be to take the class and measures to some convenient sand pile, and do your measuring there, even if you have to make several trips. Let the pupils find out for themselves not only that two pints make a quart, eight quarts a peck, and four pecks a bushel, but how many of each of the smaller measures will fill each of the larger. After this write the table as if it were something that you and your class had found out for yourselves, and hang it up.

At another time find out by actual measurement what part of a bushel one peck is, two pecks, etc.; what part of a peck one quart is, etc. At still another time add together bushels, pecks, quarts, etc., and subtract them from each other.

Next, you may take weight. Have a real pair of scales with the weights that usually come with them. These will probably be one ounce, two ounces, four ounces, eight ounces, and one pound. Get some sand or shot, or anything not too bulky, that can be easily and accurately divided. Weigh out an exact pound. Divide this into halves by weighing one-half against the other. Show that each half weighs just eight ounces, by weighing each with the eight-ounce weight. Write, or have your pupils write—"$\frac{1}{2}$ lb. = 8 oz." Explain the abbreviations of course. Wrap up one-half pound, and mark it "8 oz., or $\frac{1}{2}$ lb." Put this one side. Have the other half-pound divided into two equal parts by weighing it.

Ask what we get when we divide a half into two equal parts. Weigh your quarter-pounds with the four-ounce weight. Have the children write—"$\frac{1}{4}$ lb. = 4 oz." Mark one of the quarter-pounds, and put it aside as you did the half-pound, and divide the other. Continue the process till you get a single ounce. Then ask how many ounces there are in a pound, and let them find out for themselves. Ask what part of a pound is one ounce, two ounces, etc. Weigh a number of things and have them change their weights to ounces, or from ounces to pounds. Take them to the sand pile and weigh out, and put into a bag or box, twenty-five pounds. Let each pupil lift it, or try to do so. Tell them that a bag like this weighs "a quarter"; and four such bags weigh "a hundredweight." Weigh each pupil, and let them change their own weights into quarters, and also into ounces.

Take some pains to find something that weighs a ton, and take them to see it. Tell them some of the things that we usually estimate by the ton, such as coal, hay, straw, bran, etc., and if possible show them a ton, or a known weight of each. Teach addition and subtraction at first by really weighing the two things together, or by weighing the greater first and taking out the less.

Teach long measure by actual measurement. Illustrate addition by measuring the different distances one after another along a line, and then measuring the whole line; subtraction by measuring the greater distance, then laying off on it the less, and measuring what is left. Make your pupils often guess the length, breadth, and thickness of different objects, and then measure them. They can lay off their guess on a slate or the floor, and measure the object and lay that off too, and compare the two. When in their reading or other studies the dimensions of objects are given, ask them if they know anything of the same size, or make them measure out the dimensions given.

Teach square measure by drawing on the slate or floor. Have them draw a square-yard, and divide each side into three feet, and actually draw and count the nine square-feet that make it. Let them do the same with a piece of carpet four feet by five, and really count the twenty square-feet. Go through with square-inches in the same way. Teach cubic measure with clay or building blocks. If with clay, cut a large cube of it into smaller ones; if with blocks, build up a large cube from the small ones. Teach time with one of the kindergarten dials, or better yet with a cheap clock. Let your pupils count the number of seconds in a minute, and of minutes in an hour, etc.

Make all of your instruction in the whole subject such that you can feel that your pupils really know the things you are talking about and figuring out. For instance, you can talk for weeks about a dry-measure quart being larger than the wine-measure of the same name, and you will hardly be able to make a lasting impression; but if you once let them try for themselves and see that the tin quart measure, which they use for liquids, will not fill the wooden one which they use for beans or potatoes, while the contents of the wooden one will cause the other to overflow, especially if you have some discussion on the question, and the children themselves make the trial, you will always find after that a clear and explicit idea of which of the two quarts is the larger.

Notation and Numeration.

Although the notation and numeration of numbers above a thousand is the beginning of a regular course in arithmetic, and hardly belongs to the primary course of number-teaching which we have been following thus far, still we shall probably have time to teach this subject thoroughly in the fifth year, especially if our pupils can read and write numbers below a thousand readily and

quickly. If they cannot do this, they must be taught it before they try to go any farther.

Begin your instruction by trying them with enough examples under a thousand to be sure that they know them well. Then put a number of six significant figures, as 649,275, on your wall-slate. Of course they cannot write its name, and most of them will not even try to do so. Write the figures 649, denoting thousands, in another place and ask them to write the number they represent. Then do the same with 275, and ask its name. Ask how they think it would do to write the two names one after the other, "Six hundred forty-nine, two hundred seventy-five," to express the whole number. If they are willing to accept this, and they may be, for it would really do if all numbers had significant figures in every period, ask what they are going to do when figures are written one under the other, as— 649
275.

Write down in a column a half-dozen numbers—all significant figures, and having from one to three figures in the thousands period. Point off. Make a bracket over the first three figures on the right, and over that write the word "units." Tell them we never write this word in writing the name of a number, because when there is no name, such as "thousand, million, etc.," written, we always know the name is "units."

Make a bracket over the next three figures, and write "Thousand" over it. Tell your pupils that we always write this word after the name of the figures under the bracket, to tell what they mean. If there are no significant figures under the bracket, we do not write this word at all. If we did not write "thousand" after the name of the figures under this bracket, we would suppose that they meant units. Take the first number you have in your column. Copy the figures representing thousands by themselves. Tell the pupils to write the name of

these figures exactly as if they were units. Then point to the bracket over them, in the whole number that you took them from, and to the word "Thousand," and tell them to write thousand after the name they have already written. Bring the other figures down beside those you have written, not forgetting the comma. Tell them to put a comma after what they have written, and then to write the name of the last three figures which you brought down. After this let the pupils take the numbers you have written, and write them down in figures, writing in the word "thousand" after the figures which are in the thousand's period, for instance:—649, 275, becomes "649 thousand, 275." When your pupils have written all the numbers in this way, have them substitute the written name for the figures.

After this, write another half-dozen numbers, and make each pupil do for himself what you did for them all at first, seeing of course that they do not make mistakes. Some of them will hesitate when they come to the first number which does not have three significant figures in the thousand's period, but a simple direction to write the name of the number for which the figures stand will set them right. Write figures on your slate, omitting the brackets and words, and have the pupils write the names. At first, use a significant figure in every place, and continue to do so until the children acquire considerable confidence. Then begin to use ciphers. Frequently these will hardly need any explanation, but sometimes they prove very puzzling. When they do, write all three of the figures on another part of your slate, and tell the pupils to write the name of those figures, just as they always have done, and then to add the word "thousand," or the name of the period from which they came.

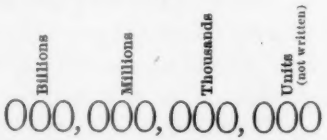
Do not teach your pupils to say, "Units, tens, hundreds, thousands, tens of thousands, hundreds of thousands, etc., etc.;" but teach that each period of three fig-

ures has its own name. These names are: "Units" (which we never write), "thousand, million, etc." The three figures in any period show how many of that name there are; and these three figures are read just as any three figures that they have been using familiarly for so long are read. They show how many of that kind there are. After telling how many, we give the name of the period to tell what kind, except in units.

To teach notation, or the writing in figures from numbers expressed in words, begin by writing the name of any number requiring six significant figures, taking pains to make the comma after thousand very distinct, as: Three hundred forty-eight thousand, five hundred seventy-two. Ask how many thousands in this number. Draw a line under the words: Three hundred forty-eight. Tell your pupils to write that in figures. If they do not do so readily and easily, on another part of your slate write the names of several numbers, such as: Six hundred twenty-seven, two hundred thirty-six, etc., etc., making them write in figures as you write in words, until their confidence in their ability to write such numbers is restored. Finally, write "three hundred forty-eight" without saying or doing anything to call particular attention to it, and they will write it just as easily as they did the other numbers. As soon as they do, call their attention to the fact that they have done what you have been trying to have them do, and ask them to rub out all that they have written except this last. Then underline the word "thousand" and ask how this is to be shown in figures. Tell them that the comma and the three figures yet to be written on the right are all that are needed for this. Have them put the comma in, and write the other three figures. They will readily do this.

After dwelling on examples of this sort for some time, begin to give such as need ciphers, and also such as need less than six figures. Be sure and use a good many in which the last three figures must all be ciphers, and ex-

plain that they are used to keep the others in their place, and so to show that they are in the second period. Show them that if they were not used, the significant figures would not mean thousands. After drilling until you are sure that all of your pupils can write any number expressed by six figures or less, pass on to the third period, and teach it in just the same way. The case where there are no thousands will need some special explanation and practice, but can be easily explained. Have the class thoroughly memorize this table:



Impress on them again and again that three figures, and only three, must always be written in each period, except the one at the right hand. If three significant figures are not needed, enough ciphers must be put before what are needed to make the whole number three, counting both ciphers and significant figures.

You have now taught more arithmetic than I should expect of pupils who have only been in school five years. Devote any time you may yet have to review. Beyond this point, the methods of teaching arithmetic to the deaf do not differ much from those employed with hearing children, except that in beginning decimals you can save time by using the object method.

FRANCIS DEVEREUX CLARKE,
Superintendent of the Michigan School, Flint, Michigan.

[TO BE CONTINUED.]

HIGHER EDUCATION IN SCHOOLS FOR THE DEAF.*

With that most excellent College for the Deaf at Washington, and, as far as expense is concerned, the easy terms upon which the graduates of our Institutions can attend it, the question might be asked, "Why talk about higher education in our Institutions?" The answer is the same as was given to those who opposed the high school in all of our villages, towns, and cities, and who cried, "Our country is dotted all over with colleges; let those who wish a higher education go to those colleges and pay their own bills." It took a long and bitter struggle to convince the taxpayer that a high school was an economical and advantageous institution, in which his child could be prepared for college if desired, and, if not, could be the gainer of something of a higher education. But now you can scarcely find a man who does not look upon the high school as the pride of the community. He sees year by year his children and the children of the poorest and richest people graduating from it and going into the world equipped educationally to perform the duties of highest citizenship, and no one knows, asks, or cares who paid the bills. If these graduates wish to enter the universities, they pass to the Freshman class without examination, and thus the public schools and the universities are linked together in one grand chain.

So, in asking for a high school in our Institutions, we ask it for the same reasons that it is given to the children of the public school. It ought, therefore, to need no agitation. It only needs to be understood that the work in our Institutions is a part of the great school system, and that it is entirely educational in every particular;

* A paper read at the Round Table Session of the National Educational Association, Milwaukee, Wisconsin, July 7th, 1897.

and when this is once understood, the State will feel herself as much under obligation to give an opportunity to the deaf child for a high school education as she does to the hearing. What! Because one of my daughters is deaf, will the great State of Ohio offer her just one half the opportunity for an education that she offers my other daughter who hears? Such a proposition is unpatriotic and unjust, and the State would spurn such a thought.

I shall not undertake to discuss the necessity of a high school or the extent to which deaf children can be educated. I refer you to the valuable articles which have been published in the *American Annals of the Deaf* and the proceedings of the various conventions and conferences for the past forty years. I beg, however, to mention some of the efforts which the good men and women have made toward a higher education for the deaf, and after that, to discuss a plan for still raising the standard.

In 1851, at the second Convention of the American Instructors of the Deaf, William W. Turner, of Hartford, Conn., reporting for a committee, recommended the establishment of a High School, and strongly urged the feasibility of a separate institution at which all pupils of sufficient education from all the Institutions would be eligible to attend. While all agreed on the necessity for the higher education, they differed as to the proper plan of securing it, and so nothing was done. However, the next year the directors of the American Asylum adopted a plan for a high class in that Institution covering two years of study, the eighth and the ninth, and William W. Turner was placed in charge of it. The studies were Mathematics, Natural Philosophy, Natural History, and Grammar. In the same year Dr. Harvey P. Peet made an elaborate report on the higher education as he had seen it in France, and the Board of the New York School provided for a high class of the eighth and ninth years of instruction, including Drawing, Natural Philosophy, Natural

History, Algebra, Geometry, Logic and Moral Philosophy. Twenty pupils formed the first class. The work of both these classes is reported as being highly commendable. Soon after, the War of the Rebellion disturbed the work of progress, and but little is recorded until after the organization of the College in 1864.

In 1868, at the first Conference of Principals, Prof. Lewellyn Pratt, of the National Deaf-Mute College, read a paper entitled "The College and Its Relations to the Institutions." He urged the hearty co-operation of the College and the Institutions to the end that deaf-mutes might attain to a higher education. The Conference passed resolutions recommending the establishment of high classes in all the Institutions, and, as far as I have been able to ascertain, this has been done. But as the tenure of school was only five to seven years, and later nine years, the high class education must have fallen short of a high school education, as we now term it.

But in searching for information touching the scope and thoroughness of the work done in the '40's and '50's in the short period of five or seven years, I have found it highly satisfactory. I am not sure but that a comparison of work in the same period of time would put us all at a disadvantage. We admit our children at a younger age, and having before us a long ten or eleven or twelve years, possibly do not push matters as vigorously as was done when a shorter time was given each child in an Institution. If the children of the Hartford and New York Schools, in 1852, after a seven years' course, were able to comprehend Physics, Natural History, Mental and Moral Philosophy, Algebra and Geometry, what could their instructors have done for them in twelve years? Does any one doubt that these children could have mastered the ordinary high school course of our public schools? If so, he must doubt the word of such high authority as Dr. Harvey Peet and William Turner. For myself, I do not

doubt it. I believe with all my heart that our Institutions can be so managed and our school work so directed that where a twelve-year course is in operation, the last three years can be given in a large measure to higher work, and that our graduates can be prepared for the Freshman year in college. This would save the expense of maintaining an introductory department and enlarge the facilities for college work. Not only that, but it would give to the large class of our graduates who never attend college the same education that the hearing graduate receives in the public schools, and fit them proportionally for life.

I think I hear some one ask, "Do you expect us to do high school work and not extend the school term beyond twelve years?" I answer, Dr. Peet was clamoring for it when the term was only nine years. I think, in the first place, our schools can be worked up some from the bottom, and, in the second place, our courses of instruction can be enriched so we can teach some elementary science from the seventh year on. Our literary and historical work can be woven in with our language work to advantage, so that information of fact can go with the learning of language. In this way at least one year of high school work will be done before we enter the work proper. After a good foundation is laid by ten years of school work, the eleventh and twelfth years can be devoted to the studies of Rhetoric, Literature, Latin, Physics, Chemistry, Botany, Algebra and Geometry. By the careful prosecution of these studies under the direction of competent teachers, more progress will be made by the learner in the mastery of language than if he is kept constantly reviewing the simpler studies with which he is already familiar. The graduate from this course ought to be able to enter the Freshman class in college or else not be allowed to graduate.

It would seem advisable, and it is recommended, that

this Convention appoint a committee to compare the courses of study of the various Institutions and to report the result of its findings with any recommendations it may wish to make at the Convention to be held next year. This would surely tend to unity of work in the Institutions and would enable us to make closer our relations to the College at Washington.

We have undertaken in the Ohio School to do some of this work in the higher branches of Latin, Algebra, Physics, General History and Literature. One year of work along this line has encouraged us to make this recommendation. There is not a doubt in my mind about the deaf children making as rapid progress in these studies as the hearing children. In fact, I think their information is more perfect, and when they are given the language with which to express themselves, the deaf children will have the best of the high school training. Having taught the graduating classes in the public school for ten years, I feel I know something of their success in the acquisition of knowledge. The advantage of the deaf child will arise from the fact of its constant application to work and the concentration of all its faculties upon the school work, whereas the society in which the hearing child lives diverts its attention to the detriment of its education. Moreover, the discipline of parents is often so feeble that no study is done by the hearing child at home, and consequently but little in school. It, therefore, absorbs merely enough to make the necessary grade to pass. But in the Institution the hours are regular, the discipline is strict, and the results are consequently better.

I, therefore, commend most heartily to this Convention a more thorough training from the first year to the tenth year of school and to devote the eleventh and twelfth years to high school studies.

J. W. JONES,
Superintendent of the Ohio Institution, Columbus, Ohio.

PARAGRAPHS.—VII.*

Natural History.—Boys seem to be born naturalists, as witness the toads and other living creatures found in the usual small boy's pocket; but girls, at least some of them, have to be educated up to it. Boys have none of the feminine horror of a mouse, and a live mole has, to my own knowledge, entered the school-room in the handy receptacle of masculine clothing. The teacher did not discover the presence of the animal until it bit the finger of its captor, and then it was taken out and placed on the table, to be used as an object-lesson, and a good one it proved to be. Another time a sleeping bat suspended from a twig was brought to me, and the class had a fine view of him without disturbing his slumbers.

Directing the pupils' attention to the varying phases of insect or animal life other than their own is of double benefit, for it not only gives them an increase of knowledge or rids them of idle fears, but fills up what might otherwise prove an hour spent in devising mischief. Many a boy has been hindered from robbing a nest, and many a a hapless bird has been carefully tended, owing to the new desire to "watch what they do and tell it in class tomorrow." I have no special liking for "crawly, creepy" things myself, but I have been able to overcome much of my repugnance by seeing the children's interest. In one instance, however, I most ignominiously failed. A snail was under discussion—one of the shell-less kind than which nothing can be more repugnant, and in order to prove the correctness of what I had considered an extravagant assertion as to its length, the pupil had volunteered to bring it into the class-room. I consented, and she (for it was a young lady) soon returned with it rolled in a large newspaper. After placing it on my desk,

* Continued from the last volume of the *Annals*, page 413.

I found myself incapable of opening the wrapper, and the stress of the situation was only relieved by the pupil's saying, "I was mistaken. I think it has shrunk." I was thus enabled to retire from the field with seeming dignity, and said, "Well, then, we will not open the paper." I owned up to my failure, however, and the class rather enjoyed it. I have no hesitancy in saying to a pupil, "I do not know," in reply to a question he has asked, and I have never found that his respect for me has been diminished thereby. I am much more ashamed to say, "I have forgotten," but to either phrase I have always added, "I will try and find out for you," and this promise has always been kept.

After a certain talk on ants and their ways, the next morning brought me this account of the previous afternoon: "Some boys and I went up on the hills. Bert found a live scorpion in a hidden place where the sun does not shine. I carried it back to the school-ground in a paper. The boys wanted to know what the ants would do with it, so I put it on the ground near an ant hole. Many ants came and began to fight with the scorpion. In a little while the scorpion was dead. The ants dragged it into their hole to eat it." Then the class entered into a discussion of the question asked by one of the pupils as to how, if the scorpion was poison, the ants could eat it and not die.

Another boy brought this item: "A man weighed bees without honey and counted them 5,600 in one pound. After they gathered honey, and the man again weighed them. In one pound 1,600 bees. Different!" This was afterward written on the large slate and the word "*pollen*" substituted for "honey." Then it was suggested that the class find out how much the pollen weighed. They easily ascertained that it equalled the weight of 4,000 bees; but how much did 4,000 bees weigh? A little further analysis showed them the desired amount.

It is not so much the aim in this special line to impart

knowledge as it is to open up the way to interest in good things, that the child may, during leisure hours, neither seek the evil nor give the evil an opportunity of seeking him. Many things may be found that the children will voluntarily investigate during playtime, and which the books they use do not contain. The school-days form only a small fraction of a lifetime, and the lines they can follow without extraneous assistance are by far the most valuable. Spiders with their trailing webs or spinning their ladders from desk to floor over and over again; flies feeding on sweets placed for their consumption, caterpillars with their hairy coverings, moths chilled by the night air but reviving in the warmth of the school-room; all these have showed us through the magnifying-glass their wondrous beauty and led the pupils to seek their outdoor haunts and watch their ways. There is not an item of life which may not prove a seed from which a plant-lesson can grow.

Oh! "Earth's crammed with heaven
And every common bush aflame with God."

Alliteration.—Very often children who have become thoroughly tired of practicing a certain sound will take it up with pleasure if it is placed in an alliterative sentence and, at first, will even seem unaware that they are saying it over and over again. The following have been used lately in the school-room:

Five funny fellows fell flat on the floor.
I saw Sarah sew seven seams since supper.
The stairs were steep, still Stephen strode straight up.
Shall I show the Shetland shawl in Shasta?
Don't chide me for buying a choice chair, the cheap ones were charred.
I hope Hattie will have a happy home on the hill.
I wore my scarlet skirt and scarf and skated off to school.
My uncle thinks Frank sang wrong this morning.
We wept while we walked the weary way that led to western waters.
Answer quickly this queer question, "Can quails quack?"

After a few of the sentences had been written on the slate and the object of their writing was apparently un-

derstood, the children were asked to contribute others of their own construction and some very queer combinations followed. In many instances their attention was devoted to the spelling only and they were content if the majority of the words began with the same letter, as "Charles called on his city cousin," disregarding the fact that of the four "c's" given three were unlike in sound. It required considerable experimenting before they gained a correct idea as to what was desired.

When this line of work began to pall, the questions were varied, and they were asked how many of the specified sound were given in a certain sentence. In the second of the examples on the slate, several of the pupils omitted counting the second "s" sound in the word "since," and in the eighth, a number failed to discover the "ng" sound in "Frank" (Frangk) and "thinks" (thingks), though they had had many a lesson on that very subject.

Then the question was again changed to "How many silent letters are in this sentence?" This led to a more careful analysis of the words before pronouncing them aloud. It was interesting to watch the pupils softly repeating a word over and over, deciding one moment that such and such letters were not sounded and the next entirely reversing their decision. When they eliminated too many, they were required to write the abbreviated form and then they readily saw their mistake. Words in which the letters took other sounds than those naturally belonging to them were of course the most puzzling. In such cases the children were shown that if that special letter were removed the word could not be pronounced correctly, and it must, therefore, be allowed to remain as a representative of the sound given. The "ph" in "emphasis" and the "gh" in "enough" were retained despite the protestation of the children that neither were spoken ("o" in the latter word they admitted was valueless). It was only when "em-a-sis" and "enu" were written that they saw the necessity of their retention.

I have found these alliterative exercise of much value, and the more natural the sentence the greater the benefit. Several of the children after reading aloud, "Answer quickly this queer question, 'Can quails quack?'" replied with an emphatic "No! *ducks* quack," as though that were the aim of the sentence, quite unconscious of the fact that a drill on "kw" had been given.

The interest of the older pupils will not be lessened should you tell them that the "first species of verse found in the British Isles depended solely on alliteration for its poetic form or on the recurrence of accented syllables beginning with the same letter."* At the present day "alliteration" often seems to give an added force to a thought and at times even versifies plain prose. Take, for instance, the sentence containing the "w" exercise and change it to the following, "They cried while they trod the dusty road that led to distant rivers," and we find much of the poetic feeling eliminated, yet the oft recurring "d" still lends a semblance of poesy to the line. Talks on literature may also have such sentences introduced, and if those containing sounds difficult of pronunciation are given, the teacher will accomplish a double result.

I do not consider it absolutely a teacher's duty so to arrange each lesson that it will be perfectly palatable to the child, for there are many tasks about which no such arrangement can be made, but I do think that when a drill has been so often repeated that its approach is viewed with repugnance, it had better be dropped for the time being or else be presented in some entirely new form. It is in this way that "apt alliteration's artful aid" has served my purpose.

L. MOFFAT,
Instructor in the California Institution,
Berkeley, California.

[TO BE CONTINUED.]

* "English Versification," Wadham, London.

SCHOOL ITEMS.

American School.—Mr. William P. Williams, steward, while driving in Hartford in September last, was struck by a trolley car and so seriously injured that he died in a few days. Mr. Williams had filled the office of steward for more than seventeen years. He was an able business man and an efficient and faithful officer of the Institution. He was also prominent in the community outside, especially in church work, and his loss is deeply felt.

Central New York Institution.—Miss Laura C. Wing, a daughter of the late George Wing, and a recent graduate of the Normal Department of Gallaudet College, has been added to the corps of instruction.

Florida Institute.—Miss Tillinghast has resigned her position as teacher to be married. She is succeeded by Miss Sallie W. Mabry, formerly a teacher in the Alabama Institution.

Indiana Institution.—Miss Amelia De Motte, a daughter of Dr. W. H. De Motte, and Miss Tillie Garman have been appointed teachers in the Oral Department, and Miss Nellie J. Schrock and Miss Olive Newlin in the Kindergarten Department.

Iowa School.—Mr. George L. Wyckoff, who was connected with this school from 1883 to 1898, died suddenly at Omaha, Nebraska, September 25, 1898, of heart disease, aged 48. Mr. Wyckoff was born in Marshall, Oneida County, New York, January 22, 1850. His father and mother were both deaf-mutes. In 1864 he removed to Iowa with his parents, and later to Kansas. He entered upon the work of deaf-mute instruction as a teacher in the Kansas School in 1873, and remained there ten years, the last year as superintendent. In 1883 he was appointed a teacher in the Iowa School, and three years later was promoted to the superintendency. In 1887, when the domestic and educational departments were separated, he remained in charge of the educational department with the title of principal. Last summer he resigned this position and had arranged to engage in business in Kansas

City when death suddenly came upon him. He leaves a wife and four children; one, a daughter, is a teacher in the Illinois Institution. Mr. Wyckoff was a zealous and successful teacher, devoted to the welfare of the deaf, beloved by his pupils and associates.

Mr. E. E. Clippinger, formerly of the Wisconsin School, has been appointed Principal of the School; Mr. W. O. Connor, Jr., from the Washington State School, and Mr. Robert D. Hoyt, from the New York Institution, have been appointed teachers.

Louisiana Institution.—Mr. Charles P. Gillett, who was for several years Superintendent's secretary in the Illinois Institution, and for one year Acting Superintendent of the Minnesota School, has received an appointment as teacher. The opening of the Institution is postponed on account of the prevalence of yellow fever in the State.

Maryland School for the Colored.—Mr. D. E. Stauffer, Jr., Resident Principal, died at his home in Baltimore, Maryland, September 28, 1898, of typhoid fever. Mr. Stauffer was a native of Frederick county, Maryland. He was educated in the public schools of the State, graduating from the Normal School in Baltimore at the head of his class. In 1888 he was appointed a teacher in the department for the blind, and in 1891 Resident Principal. He served the School faithfully in both capacities, leaving nothing undone that could promote its welfare. A wife and daughter survive him.

Michigan School.—At the September meeting of the Board of Trustees the resignations of Misses Adelaide Rogers, Helen M. Haynes, and Leah J. Beach were accepted. Miss Gertrude Wilder, teacher of physical culture, was also released from her contract for the coming year. The following, who had been employed as temporary teachers, were permanently engaged: Mr. Arlington Eickhoff, B. A., a graduate of this School and of Gallaudet College, and Misses Emma D. Farnum, Ina Grear, and Fannie Thayer, who spent last year in the normal class of this School. Mr. Robert Erd, B. A., a graduate of the Illinois Institution and of Gallaudet College, has been appointed instructor in physical culture. The State Board of Charities and Corrections has allowed the request of the Trustees for a new school building at $75,000.

Mississippi Institution.—The opening of the school is again postponed this year on account of the prevalence of yellow fever in Jackson. It is feared it will not be possible to resume work until near Christmas. Mr. Dobyns is at Mississippi Springs, Raymond, Miss., while the "immune" matron, Miss Cabaniss, remains at the Institution.

Ontario Institution.—Mr. T. C. Forrester, late of the Belfast, Ireland, Institution, Miss Nina Brown, who has taught in the public schools of the Province, and Mr. Michael J. Madden, a former pupil of this Institution and a graduate of Gallaudet College, have been added to the corps of instruction.

Rhode Island Institute.—The Legislature this year appropriated twenty-five thousand dollars to be expended on additions to the Institution dormitories. At the beginning of the school year in September work on the building was still unfinished and it was found impossible to begin then. The opening was therefore postponed until Tuesday, the eighteenth of October.

South Carolina Institution.—Miss Virginia E. Walker is succeeded in the oral department by Miss Elizabeth Menefee, who was trained for the work by Miss Mary McCowen, and Miss Mauzy is transferred to that department to take the place of Miss Jane M. Washington, who resigned to teach in Nebraska. Miss Robina L. Tillinghast, a daughter of Mr. David R. Tillinghast, takes Miss Mauzy's place. Miss Luella Fowler, a graduate of the Ohio Institution and of the Cleveland Art School, succeeds Miss Nettie Crosby, who has gone to the Michigan School as instructor in art.

Texas School.—Mr. George H. Putnam, who resigned to teach in the Kansas School, is succeeded by Mr. J. H. W. Williams, formerly secretary and steward. Mr. T. A. Rose succeeds Mr. Williams as secretary and steward.

Wisconsin School.—Miss Myrtle Long, a sister of Mr. J. Schuyler Long, has been appointed teacher.

MISCELLANEOUS.

Ohio Legislation.—The following act, providing for the education of deaf-blind children, was passed by the last General Assembly:

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That, on and after the passage of this act, the institution for the education of the deaf and dumb shall also be open to receive such blind and deaf children, residents of the State, as the trustees and superintendent judge from reliable information and examination to be suitable persons to receive instruction therein, and the superintendent is hereby authorized to employ a suitable teacher or teachers, and nurse or nurses, and to make all necessary arrangements for the instruction and care of such blind and deaf children as may be admitted. The compensation of said teachers and nurses shall be fixed by the trustees. No such deaf and blind child shall be admitted under four years of age, or shall remain more than twelve years, or such a part thereof as the superintendent thinks its progress justifies; and all rules and regulations, which apply to the admittance and education of the deaf and dumb, shall apply to the deaf and blind so far as the same are applicable.

SECTION 2. The trustees of said institution, when it seems to them fit and proper, shall provide for the education of any deaf and blind child at its home, the teachers to be appointed and directed the same as when the child is placed in the institution.

SECTION 3. This act shall take effect from and after its passage.

The following act, "authorizing school districts managed by boards of education or school councils to establish and maintain day schools for the deaf, and authorizing payment therefor from state common school funds," also passed:

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That upon application by a board of education or school council of any school district in this State to the State commissioner of schools, he shall grant permission to such board of education or school council, and such board of education or school council shall thereupon be empowered to maintain within its limits one or more day schools, having an average attendance of not less than five pupils, for the instruction of deaf persons over the age of three and under fifteen years, residents of the State of Ohio.

SECTION 2. Such board of education or school council, which shall maintain one or more day schools for the instruction of the deaf, shall report to the State commissioner of schools annually, and as often as such State commissioner shall direct, such facts concerning such school or schools as he may require.

SECTION 3. The county auditor in each county is hereby authorized and directed to apportion and the county treasurer to pay out of the State common school fund received by such county, to the treasurer or other financial officer of such board of education or school council, maintaining such school or schools for the instruction of the deaf, the sum of one hundred and fifty dollars for each deaf pupil, resident of such county, instructed in any such school for at least nine months during the school year, and a share of such sum proportionate to the term of instruction of any such pupil as shall be so instructed less than nine months during such year. If no such school shall be maintained in any county, but persons residing in such county shall attend such school in another county, then the county treasurer of the county not maintaining such school shall apportion and pay to the financial officer of the board of education or school council of such other county the amount above specified for each pupil attending such school in such other county.

SECTION 4. The sums provided in the next preceding section shall be paid by such county treasurer as soon as may be after the receipt by him of the State common school fund in each year, upon satisfactory proof being made to him by the president or clerk of such board of education or school council maintaining such school, of the number of pupils instructed in such school or schools, and their residences, and the period of time each such pupil shall have been so instructed in such school or schools for the preceding school year.

SECTION 5. All teachers in such schools shall be appointed by the State commissioner of schools upon application of the board of education or school council of the school district maintaining such school or schools; the State commissioner of schools to have the power to remove such teachers for cause. No person shall be appointed to teach in any such school who shall not have first obtained a teacher's certificate as provided by law, and who shall not have received specific instruction in the teaching of the deaf for a term or not less than one year.

SECTION 6. The State school commissioner shall select some competent person to inspect all day schools organized under this act, or by other authority, and shall cause an inspection to be made of said schools at least twice a year, and said person so appointed shall make a written report to the state commissioner of common schools of the buildings in which said schools are being held, the method of instruction and all other matters which may seem to be of interest and profit to the education of the children in said schools.

SECTION 7. This act shall take effect and be in force from and after its passage.

Conventions of the Deaf.—In addition to the conventions of the deaf mentioned in the last number of the *Annals* as

having been held this year, there were also conventions or school reunions in Michigan, Kentucky, and Texas, making fourteen such gatherings during the summer.

Hutton's Mimography.—We have received the following letter from Mr. James Fearon, Principal of the Halifax Institution:

INSTITUTION FOR THE DEAF,
HALIFAX, N. S., *May* 22, 1898.

To the Editor of the Annals:

SIR: A few days ago there came into my possession a manuscript volume, being a specimen dictionary of signs, written by Mr. George Hutton, father of Mr. J. Scott Hutton, late Principal of this Institution. I consider it of immense historical value, and I feel that teachers of the deaf would be greatly interested in its publication, being, as it is, a unique work in itself. The history of the matter is exceedingly interesting.

Over seventy years ago Mr. George Hutton, a teacher of the hearing as well as of the deaf, commenced the production of a dictionary of signs. Nearly twenty years afterwards a lady in Dublin, Ireland, offered a prize to teachers of the deaf for a system of mimography, and Mr. G. Hutton became a competitor and forwarded her his work. A committe of examiners was appointed, but Mr. Hutton's work being the only one offered in competition the matter was allowed to stand over and somehow or other the volume was mislaid. In 1872, Mr. J. Scott Hutton brought the subject of his father's system of mimography before the Convention held at Indianapolis, and a committee was appointed to investigate the matter and report at the next Convention. Mr. Hutton wrote to the lady above referred to in Ireland for his father's production. As far as I can learn there was no response to his communication, and it was only the other day, after a lapse of twenty-six years, the author and the son of the author having since both passed away, that a reply in the form of the book itself and Mr. J. Scott Hutton's letter of June 18, 1872, came into my hands.

If the profession think the work is of sufficient interest and importance, it is intended to publish it through the Volta Bureau.

Yonrs sincerely,

J. FEARON.

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